

described as a common side or as a corner of a substrate. Therefore Applicants declare that claims 3, 6 and 22 do particularly point out and do distinctly claim the subject matter which Applicants regard as their invention, and that claims 3, 4, 6, 7, 22 and 23 should be allowable.

Relative to claims 8-14, the Examiner opines that there is only one voltage source, and it is unclear how a first voltage and second voltage are created. Applicants respond by drawing the Examiner's attention to page 7, lines 10-14 of the specification, and to Figs. 1 and 2, wherein more than one voltage are recited and shown. Specifically, at page 7, lines 10-14 of the specification, positive voltage  $V2+$  is applied to a first end portion 22 of the second electrode and two negative voltages  $V1-$  and  $V3-$  are respectively applied to the second end portions 34 and 14 of the third and first electrodes. Further, Fig. 1 shows six different voltages, three positive voltages and three negative voltages, and Fig. 2 shows two positive voltages and three negative voltages. Therefore, Applicants declare that claims 8-14 do particularly point out and do distinctly claim the subject matter which Applicants regard as their invention, and that claims 8-18 and 20 should be allowable.

Responsive to the rejection of claims 1-3, 6 and 7 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,181,006 (Shafe et al.), Applicants have amended claims 1 and 6. Accordingly, Applicants submit that claim 1 and claims 2 and 3 depending therefrom; and claim 6 and claim 7 depending therefrom, are now in condition for allowance, which is hereby respectfully requested.

Shafe et al. disclose an electric device having a conductive polymer composition including two electrodes 3 and 4, each forming a pattern on the surface of resistive element 2. Electrode 3 is presumably connected to connector 5, and electrode 4 is connected to connector 6 (column 6, lines 8-12 and the Figure).

In contrast, claim 1, as amended, recites in part:

...the first electrical terminal in electrical contact with the first ... end of the first electrode, the second electrical terminal in electrical contact with the second ... end of the first electrode, the third electrical terminal in electrical contact with the first ... end of the second electrode and the fourth electrical terminal in electrical contact with the second ... end of the second electrode...

(Emphasis added.) Applicants submit that such an invention is neither taught, disclosed nor suggested by Shafe et al. or any of the other cited references, alone or in combination, and includes distinct advantages thereover.

Shafe et al. disclose two electrodes having one electrical contact at one end of each electrode. Thus, Shafe et al. fails to teach or suggest a first electrical terminal in electrical contact with the first end of the first electrode, the second electrical terminal in electrical contact with the second end of the first electrode, the third electrical terminal in electrical contact with the first end of the second electrode and the fourth electrical terminal in electrical contact with the second end of the second electrode, as recited in part in claim 1 as amended. The present invention as set forth by claim 1, as amended, has distinct advantages over Shafe et al., in that power may be applied to the terminals located at both ends of each electrode. The selection of voltages applied to each end of each electrode thereby controls the amount of heat produced in the electrode as well as the amount of heat produced in the thermistor material. For example, a voltage difference can be applied to the two terminals of one electrode to produce heat by way of the one electrode, something that Shafe et al. cannot do since the electrodes of Shafe et al. each have only one electrical connection. Accordingly, Applicants submit that claim 1 and claims 2 and 3 depending therefrom, are now in condition for allowance, which is hereby respectfully requested.

In further contrast, claim 6, as amended, recites in part:

...the first electrical terminal in electrical contact with the first opposite end portion of the first electrode, the second electrical terminal in electrical contact with the second opposite end portion of the first electrode...

(Emphasis added.) Applicants submit that such an invention is neither taught, disclosed nor suggested by Shafe et al. or any of the other cited references, alone or in combination, and includes distinct advantages thereover.

Shafe et al. disclose two electrodes having one electrical contact at one end of each electrode. Thus, Shafe et al. fails to teach or suggest a first electrical terminal in electrical contact with the first opposite end portion of the first electrode, the second electrical terminal in electrical contact with the second opposite end portion of the first electrode, as recited in part in claim 6 as amended. The present invention as set forth by claim 6, as amended, has distinct advantages over Shafe et al., in that power may be applied to the terminals located at both ends of each electrode. The selection of voltages applied to each end of each electrode thereby controls the amount of heat produced in the electrode as well as the amount of heat produced in the thermistor material. For example, a voltage difference can be applied to the two terminals of one electrode to produce heat by way of the one electrode, something that Shafe et al. cannot do since the electrodes of Shafe et al. each have only one electrical connection. Accordingly, Applicants submit that claim 6, and claim 7 depending therefrom, are now in condition for allowance, which is hereby respectfully requested.

Responsive to the rejection of claims 1, 5-7 and 21-23 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 3,287,684 (Armbruster, Jr.), Applicants have amended claims 1, 6 and 21. Accordingly, Applicants submit that claim 1 and claim 5 depending therefrom; claim 6 and claim 7 depending therefrom; and claim 21 and claims 22 and 23 depending therefrom, are now in condition for allowance, which is hereby respectfully requested.

Armbruster, Jr. discloses an electrical heating device including a non-conductive substrate 11 with a layer of electrical resistance material 13 formed thereon (column 2, lines 32-45). Two header bus bars 15 and 17 are printed on an upper portion of substrate 11. Connected to bus bars 15 and 17 are seven distribution bus bars 19-25 made of conductive ink and printed on resistance material 13 (column 2, lines 64-72). Each header bus bar 15 and 17 has an electrical power terminal connected thereto (column 3, lines 21-22 and Figs. 1 and 4-6).

In contrast, claim 1, as amended, recites in part:

...the first electrical terminal in electrical contact with the first ... end of the first electrode, the second electrical terminal in electrical contact with the second ... end of the first electrode, the third electrical terminal in electrical contact with the first ... end of the second electrode and the fourth electrical terminal in electrical contact with the second ... end of the second electrode...

(Emphasis added.) Applicants submit that such an invention is neither taught, disclosed nor suggested by Armbruster, Jr. or any of the other cited references, alone or in combination, and includes distinct advantages thereover.

Armbruster, Jr. discloses two bus bars, each having one electrical power terminal at one end of each electrode. Thus, Armbruster, Jr. fails to teach or suggest a first electrical terminal in electrical contact with the first end of the first electrode, the second electrical terminal in electrical contact with the second end of the first electrode, the third electrical terminal in electrical contact with the first end of the second electrode and the fourth electrical terminal in electrical contact with the second end of the second electrode, as recited in part in claim 1 as amended. The present invention as set forth by claim 1, as amended, has distinct advantages over Armbruster, Jr., in that power may be applied to the terminals located at both ends of each electrode. The selection of voltages applied to each end of each electrode thereby controls the amount of heat produced in the electrode as well as the amount

of heat produced in the thermistor material. For example, a voltage difference can be applied to the two terminals of one electrode to produce heat by way of the one electrode, something that Armbruster, Jr. cannot do since the electrodes of Armbruster, Jr. each have only one electrical connection. Accordingly, Applicants submit that claim 1 and claim 5 depending therefrom, are now in condition for allowance, which is hereby respectfully requested.

In further contrast, claim 6, as amended, recites in part:

...the first electrical terminal in electrical contact with the first opposite end portion of the first electrode, the second electrical terminal in electrical contact with the second opposite end portion of the first electrode...

(Emphasis added.) Applicants submit that such an invention is neither taught, disclosed nor suggested by Armbruster, Jr. or any of the other cited references, alone or in combination, and includes distinct advantages thereover.

Armbruster, Jr. discloses two bus bars, each having one electrical power terminal at one end of each electrode. Thus, Armbruster, Jr. fails to teach or suggest a first electrical terminal in electrical contact with the first opposite end portion of the first electrode, the second electrical terminal in electrical contact with the second opposite end portion of the first electrode, as recited in part in claim 6 as amended. The present invention as set forth by claim 6, as amended, has distinct advantages over Armbruster, Jr., in that power may be applied to the terminals located at both ends of each electrode. The selection of voltages applied to each end of each electrode thereby controls the amount of heat produced in the electrode as well as the amount of heat produced in the thermistor material. For example, a voltage difference can be applied to the two terminals of one electrode to produce heat by way of the one electrode, something that Armbruster, Jr. cannot do since the electrodes of Armbruster, Jr. each have only one electrical connection. Accordingly, Applicants submit

that claim 6, and claim 7 depending therefrom, are now in condition for allowance, which is hereby respectfully requested.

In yet further contrast, claim 21, as amended, recites in part:

...the first electrical terminal in electrical contact with the first ... end of the first electrode, the second electrical terminal in electrical contact with the second ... end of the first electrode, the third electrical terminal in electrical contact with the first ... end of the second electrode and the fourth electrical terminal in electrical contact with the second ... end of the second electrode...

(Emphasis added.) Applicants submit that such an invention is neither taught, disclosed nor suggested by Armbruster, Jr. or any of the other cited references, alone or in combination, and includes distinct advantages thereover.

Armbruster, Jr. discloses two bus bars, each having one electrical power terminal at one end of each electrode. Thus, Armbruster, Jr. fails to teach or suggest a first electrical terminal in electrical contact with the first end of the first electrode, the second electrical terminal in electrical contact with the second end of the first electrode, the third electrical terminal in electrical contact with the first end of the second electrode and the fourth electrical terminal in electrical contact with the second end of the second electrode, as recited in part in claim 21 as amended. The present invention as set forth by claim 21, as amended, has distinct advantages over Armbruster, Jr., in that power may be applied to the terminals located at both ends of each electrode. The selection of voltages applied to each end of each electrode thereby controls the amount of heat produced in the electrode as well as the amount of heat produced in the thermistor material. For example, a voltage difference can be applied to the two terminals of one electrode to produce heat by way of the one electrode, something that Armbruster, Jr. cannot do since the electrodes of Armbruster, Jr. each have only one electrical connection. Accordingly, Applicants submit that claim 21 and claims 22 and 23

depending therefrom, are now in condition for allowance, which is hereby respectfully requested.

Responsive to the rejection of claims 1-3, 5-7 and 21-23 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,777,351 (Batliwalla et al.), Applicants have amended claims 1, 6 and 21. Accordingly, Applicants submit that claim 1 and claims 2, 3 and 5 depending therefrom; claim 6 and claim 7 depending therefrom; and claim 21 and claims 22 and 23 depending therefrom, are now in condition for allowance, which is hereby respectfully requested.

Batliwalla et al. disclose a device including a conductive polymer composition (Figs. 1-4) having a laminar PTC conductive polymer element 11. One embodiment includes electrode 12 carried on element 11 with interdigitating comb-like electrodes 13 and 14. On top of electrodes 13 and 14 are termination pads 15 and 16, which, per Fig. 1, are located at one end of the device. Another embodiment has three parallel bus connector strips. Center connector 16 is of one polarity and outer connectors 15 are at an opposite polarity. Printed on top of element 11 and connectors 15 and 16 are electrodes 12-14 in a continuous pattern, with insulating jacket 17 thereover (column 20, lines 24-47).

In contrast, claim 1, as amended, recites in part:

...the first electrical terminal in electrical contact with the first ... end of the first electrode, the second electrical terminal in electrical contact with the second ... end of the first electrode, the third electrical terminal in electrical contact with the first ... end of the second electrode and the fourth electrical terminal in electrical contact with the second ... end of the second electrode...

(Emphasis added.) Applicants submit that such an invention is neither taught, disclosed nor suggested by Batliwalla et al. or any of the other cited references, alone or in combination, and includes distinct advantages thereover.

Batliwalla et al. disclose parallel bus electrodes, each having one electrical power terminal at one end of each electrode. Thus, Batliwalla et al. fail to teach or suggest a first electrical terminal in electrical contact with the first end of the first electrode, the second electrical terminal in electrical contact with the second end of the first electrode, the third electrical terminal in electrical contact with the first end of the second electrode and the fourth electrical terminal in electrical contact with the second end of the second electrode, as recited in part in claim 1 as amended. The present invention as set forth by claim 1, as amended, has distinct advantages over Batliwalla et al., in that power may be applied to the terminals located at both ends of each electrode. The selection of voltages applied to each end of each electrode thereby controls the amount of heat produced in the electrode as well as the amount of heat produced in the thermistor material. For example, a voltage difference can be applied to the two terminals of one electrode to produce heat by way of the one electrode, something that Batliwalla et al. cannot do since the electrodes of Batliwalla et al. each have only one electrical connection. Accordingly, Applicants submit that claim 1 and claims 2, 3 and 5 depending therefrom, are now in condition for allowance, which is hereby respectfully requested.

In further contrast, claim 6, as amended, recites in part:

...the first and second electrodes each having first and second opposite end portions located at a common termination zone on the substrate, the first electrical terminal in electrical contact with the first opposite end portion of the first electrode, the second electrical terminal in electrical contact with the second opposite end portion of the first electrode...

(Emphasis added.) Applicants submit that such an invention is neither taught, disclosed nor suggested by Batliwalla et al. or any of the other cited references, alone or in combination, and includes distinct advantages thereover.

Batliwalla et al. disclose parallel bus electrodes, each having one electrical power terminal at one end of each electrode. Thus, Batliwalla et al. fail to teach or suggest a first and second electrodes each having first and second opposite end portions located at a common termination zone on the substrate, the first electrical terminal in electrical contact with the first opposite end portion of the first electrode, the second electrical terminal in electrical contact with the second opposite end portion of the first electrode, as recited in part in claim 6 as amended. The present invention as set forth by claim 6, as amended, has distinct advantages over Batliwalla et al., in that power may be applied to the terminals located at both ends of each electrode. The selection of voltages applied to each end of each electrode thereby controls the amount of heat produced in the electrode as well as the amount of heat produced in the thermistor material. For example, a voltage difference can be applied to the two terminals of one electrode to produce heat by way of the one electrode, something that Batliwalla et al. cannot do since the electrodes of Batliwalla et al. each have only one electrical connection. Accordingly, Applicants submit that claim 6, and claim 7 depending therefrom, are now in condition for allowance, which is hereby respectfully requested.

In yet further contrast, claim 21, as amended, recites in part:

...the first electrical terminal in electrical contact with the first ... end of the first electrode, the second electrical terminal in electrical contact with the second ... end of the first electrode, the third electrical terminal in electrical contact with the first ... end of the second electrode and the fourth electrical terminal in electrical contact with the second ... end of the second electrode...

(Emphasis added.) Applicants submit that such an invention is neither taught, disclosed nor suggested by Batliwalla et al. or any of the other cited references, alone or in combination, and includes distinct advantages thereover.

Batliwalla et al. disclose parallel bus electrodes, each having one electrical power terminal at one end of each electrode. Thus, Batliwalla et al. fail to teach or suggest a first

electrical terminal in electrical contact with the first end of the first electrode, the second electrical terminal in electrical contact with the second end of the first electrode, the third electrical terminal in electrical contact with the first end of the second electrode and the fourth electrical terminal in electrical contact with the second end of the second electrode, as recited in part in claim 21 as amended. The present invention as set forth by claim 21, as amended, has distinct advantages over Batliwalla et al., in that power may be applied to the terminals located at both ends of each electrode. The selection of voltages applied to each end of each electrode thereby controls the amount of heat produced in the electrode as well as the amount of heat produced in the thermistor material. For example, a voltage difference can be applied to the two terminals of one electrode to produce heat by way of the one electrode, something that Batliwalla et al. cannot do since the electrodes of Batliwalla et al. each have only one electrical connection. Accordingly, Applicants submit that claim 21 and claims 22 and 23 depending therefrom, are now in condition for allowance, which is hereby respectfully requested.

Responsive to the rejection of claims 8-14, 17 and 18 under 35 U.S.C. § 103(a) as being unpatentable over Batliwalla et al. in view of U.S. Patent No. 5,004,895 (Nishino et al.) or U.S. Patent No. 3,892,946 (Rimmi), Applicants have amended claim 8. Accordingly, Applicants submit that claim 8 and claims 7-14, 17 and 18 depending therefrom are now in condition for allowance, which is hereby respectfully requested.

Batliwalla et al. is discussed above.

Nishino et al. disclose a heater device for floor material (Figs. 1-4) including belt shaped electrodes 3-6 connectable to a power source by way of switch 13 (column 4, lines 57-69).

Rimmi discloses a control system for an electrical heating device (Figs. 2-6) such as electrical stove 1 having electrical heating elements 2a and 2b, each of which is controlled by its own coil switch 4a and 4b in control center 3, placed outside of a sauna (column 1, lines 40-45).

In contrast, claim 8, as amended, recites in part:

...first, second and third electrodes each having opposite end portions located at a common termination zone of the substrate, each opposite end portion of each electrode having a corresponding different one of the plurality of electrical terminals connected thereto...

(Emphasis added.) Applicants submit that such an invention is neither taught, disclosed nor suggested by Batliwalla et al., Nishino et al., Rimmi or any of the other cited references, alone or in combination, and includes distinct advantages thereover.

Batliwalla et al. disclose parallel bus electrodes, each having one electrical power terminal at one end of each electrode. Nishino et al. disclose a heater device for floor material including belt shaped electrodes 3-6 connectable to a power source by way of switch 13. Rimmi discloses a control system for an electrical heating device such as electrical stove 1 having electrical heating elements 2a and 2b each of which is controlled by its own coil switch 4a and 4b in control center 3, placed outside of a sauna. Thus, Batliwalla et al., Nishino et al., and Rimmi alone or in combination fail to teach or suggest a first, second and third electrodes each having opposite end portions located at a common termination zone of the substrate, each opposite end portion of each electrode having a corresponding different one of the plurality of electrical terminals connected thereto, as recited in part in claim 8 as amended. The present invention as set forth by claim 8, as amended, has distinct advantages over Batliwalla et al., Nishino et al., and Rimmi, in that power may be applied to the

terminals located at both ends of each electrode. The selection of voltages applied to each end of each electrode thereby controls the amount of heat produced in the electrode as well as the amount of heat produced in the thermistor material. For example, a voltage difference can be applied to the two terminals of one electrode to produce heat by way of the one electrode, something that the cited prior art cannot do since the electrodes of the cited prior art each have only one electrical connection. Accordingly, Applicants submit that claim 8 and claims 9-14, 17 and 18 depending therefrom, are now in condition for allowance, which is hereby respectfully requested.

Claim 14 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Batliwalla et al., Nishino et al. or Rimmi as applied to claim 8 and in further view of Shafe et al. However, claim 14 depends from claim 8, which has been placed in condition for allowance for the reasons given above. Accordingly, Applicants submit that claim 14 is now in condition for allowance, which is hereby respectfully requested.

Claim 20 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Batliwalla et al., Nishino et al. or Rimmi as applied to claim 8 and in further view of Armbruster, Jr. and Shafe et al. However, claim 20 depends from claim 8, which has been placed in condition for allowance for the reasons given above. Accordingly, Applicants submit that claim 20 is now in condition for allowance, which is hereby respectfully requested.

Claim 16 was objected to as being dependent upon a rejected base claim, but was indicated to be allowable if rewritten in independent form, including all of the limitations of the base claim and any intervening claims. In response thereto, claim 16 has been amended to include all of the limitations of base claim 8. Therefore, it is respectfully submitted that claim 16 has now been written in proper independent form, including all of the limitations of the

base claim and the intervening claims from which it depended. Claim 16 therefore should now be allowable.

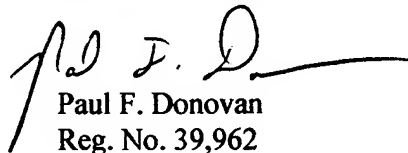
Claims 4 and 15 were rejected under 35 U.S.C. § 112, second paragraph, and are in condition for allowance for the reasons given herein. However, the Examiner did not otherwise address claims 4 and 15. Accordingly, Applicants submit that claims 4 and 15 are in condition for allowance, which is hereby respectfully requested.

For the foregoing reasons, Applicants submit that the pending claims are definite and do particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Moreover, Applicants submit that no combination of the cited references teaches, discloses or suggests the subject matter of the amended claims. The pending claims are therefore in condition for allowance, and Applicants respectfully request withdrawal of all rejections and allowance of the claims.

No new matter has been added by way of the amendments and remarks made herein.

In the event that there are any issues that can be expedited by telephone conference, the Examiner is invited to telephone the undersigned at the number indicated below.

Respectfully submitted,

  
Paul F. Donovan  
Reg. No. 39,962

Illinois Tool Works Inc.  
3600 West Lake Avenue  
Glenview, Illinois 60025  
(847) 657-4075